

What is claimed is:

- 1 1. An apparatus for speech recognition, comprising:
 - 2 an acoustic processor, wherein said acoustic processor converts analog speech
 - 3 input signals into digital signals;
 - 4 a first storage structure, wherein said first storage structure stores an acoustic
 - 5 model which has learned voice characteristics;
 - 6 a second storage structure, wherein said second storage structure stores a
 - 7 dictionary containing a first language model which has been trained regarding
 - 8 disfluency words and non-disfluency words, and a second language model which has
 - 9 been trained regarding non-disfluency words and trained to ignore disfluency words;
 - 10 and
 - 11 a probability calculator, wherein said probability calculator calculates a probability
 - 12 regarding said digital signals using said acoustic model and said dictionary to recognize
 - 13 words showing the highest probability of representing said input signals.
- 1 2. The apparatus for speech recognition according to claim 1, wherein said first and
- 2 second language models are N-gram models.

- 1 3. A computer system, comprising:
- 2 an input receiver, wherein said input receiver inputs analog speech;
- 3 a processing converter, wherein said processing converter converts said analog
- 4 speech into digital signals;
- 5 a first storage structure, wherein said first storage structure stores an acoustic
- 6 model which has learned voice characteristics;
- 7 a second storage structure, wherein said second storage structure stores a
- 8 dictionary containing a first language model which has been trained regarding
- 9 disfluency words and non-disfluency words, and a second language model which has
- 10 been trained regarding non-disfluency words and trained to ignore disfluency words;
- 11 a probability calculator for calculating a probability regarding said digital signals
- 12 using said acoustic model and said dictionary to recognize words showing the highest
- 13 probability of representing said analog speech; and
- 14 a display apparatus for displaying results of said recognition.
- 1 4. The computer system according to claim 3, wherein said first and second
- 2 language models are N-gram models.

1 5. A method for speech recognition, comprising the steps of:
2 converting analog speech input signals into digital signals;
3 storing a dictionary containing a first language model which has been trained
4 regarding disfluency words and non-disfluency words, and a second language model
5 which has been trained regarding non-disfluency words and trained to ignore disfluency
6 words; and
7 calculating a probability regarding said digital signals using said acoustic model
8 and said dictionary to recognize words showing the highest probability of representing
9 said input signals.

1 6. The method for speech recognition according to claim 5, wherein said first and
2 second language models are N-gram models.

1 7. A method for speech recognition, comprising the steps of:
2 receiving analog speech input;
3 converting said analog speech into digital signals;
4 storing a dictionary containing a first language model which has been trained
5 regarding disfluency words and non-disfluency words, and a second language model
6 which has been trained regarding non-disfluency words and trained to ignore disfluency
7 words;
8 calculating a probability regarding said digital signals using said acoustic model
9 and said dictionary to recognize words showing the highest probability of representing

10 said speech input; and
11 displaying results of said recognition.

1 8. The method for speech recognition according to claim 7, wherein said first and
2 second language models are N-gram models.

1 9. A storage medium readable by a computer containing a computer program, said
2 storage medium storing an acoustic model and storing a dictionary containing a first
3 language model which has been trained regarding disfluency words and non-disfluency
4 words, and a second language model which has been trained regarding non-disfluency
5 words and trained to ignore disfluency words, wherein said computer program is
6 designed to calculate a probability regarding digital signals converted from analog
7 speech signals inputted into said computer using said dictionary to recognize words
8 showing the highest probability of representing said analog speech signals.

1 10. The storage medium according to claim 9, wherein said first and second
2 language models are N-gram models.

1 11. A storage medium for storing a dictionary comprising a first language model
2 which has been trained regarding disfluency words and non-disfluency words, and a
3 second language model which has been trained regarding non-disfluency words and
4 trained to ignore disfluency words.

1 12. The storage medium according to claim 11, wherein said first and second
2 language models are N-gram models.

1 13. An apparatus for recognizing speech from texts comprising disfluency words and
2 non-disfluency words, said apparatus comprising:

3 a first judging processor, wherein said first judging processor judges whether
4 words inputted as an object of recognition are non-disfluency words;

5 a second judging processor, wherein said second judging processor judges
6 whether said inputted words constituting a condition necessary for recognizing said
7 inputted words consist of only non-disfluency words, if said inputted words have been
8 judged to be non-disfluency words by said first judging processor; and

9 a first probability calculator, wherein said first probability calculator calculates a
10 probability, if said conditional words have been judged as containing non-disfluency
11 words and disfluency words by said second judging processor, by using a dictionary
12 containing a first language model which has been trained regarding disfluency words
13 and non-disfluency words, and a second language model which has been trained
14 regarding non-disfluency words and trained to ignore disfluency words so as to
15 recognize words showing the highest probability of representing said inputted words.

- 1 14. The apparatus for speech recognition according to claim 13, further comprising:
2 a second probability calculator, wherein said second probability calculator
3 calculates said probability based on said first language model, if said object words have
4 been judged as not being non-disfluency words by said first judging processor.
- 1 15. The apparatus for speech recognition according to claim 13, further comprising:
2 a third probability calculator, wherein said third probability calculator calculates
3 probability based on said second language model, if said conditional words have been
4 judged as containing only non-disfluency words by said second judging processor.
- 1 16. The apparatus for speech recognition according to claim 14, further comprising:
2 a third probability calculator, wherein said third probability calculator calculates
3 said probability based on said second language model, if said conditional words have
4 been judged as containing only non-disfluency words by said second judging processor.
- 1 17. The apparatus for speech recognition according to claim 13, said first probability
2 calculator further comprising:
3 a third judging processor, wherein said third judging processor judges whether a
4 word immediately preceding said object word is a disfluency word; and
5 a fourth probability calculator, wherein said fourth probability calculator
6 calculates said probability based on said first and said second language models, if said
7 preceding word has been judged a disfluency word by said third judging processor.

1 18. The apparatus for speech recognition according to claim 14, said first probability
2 calculator further comprising:

3 a third judging processor, wherein said third judging processor judges whether a
4 word immediately preceding said object word is a disfluency word; and

5 a fourth probability calculator, wherein said probability calculator calculates said
6 probability based on said first and said second language models, if said preceding word
7 has been judged to be a disfluency word by said third judging processor.

1 19. The apparatus for speech recognition according to claim 15, said first probability
2 calculator further comprising:

3 a third judging processor, wherein said third judging processor judges whether a
4 word immediately preceding said object word is a disfluency word; and

5 a fourth probability calculator, wherein said probability calculator calculates said
6 probability based on said first and said second language models, if said preceding word
7 has been judged to be a disfluency word by said third judging processor.

1 20. The apparatus for speech recognition according to claim 17, further comprising a
2 fifth probability calculator, wherein said fifth probability calculator calculates said
3 probability based on said second language model, if said preceding word has been
4 judged as not being a disfluency word by said third judging processor.

1 21. The apparatus for speech recognition according to claim 18, further comprising a
2 fifth probability calculator, wherein said fifth probability calculator calculates said
3 probability based on said second language model, if said preceding word has been
4 judged as not being a disfluency word by said third judging processor.

1 22. The apparatus for speech recognition according to claim 19, further comprising a
2 fifth probability calculator, wherein said fifth probability calculator calculates said
3 probability based on said second language model, if said preceding word has been
4 judged as not being a disfluency word by said third judging processor.

1 23. A method for recognizing speech from texts comprising disfluency words and
2 non-disfluency words, comprising the steps of:
3 (a) judging whether words inputted as an object of recognition are non-disfluency
4 words;
5 (b) judging further whether said words constituting a condition necessary for
6 recognizing said input words consist only of non-disfluency words, if said inputted words
7 have been judged to be non-disfluency words in said step (a); and
8 (c) calculating a probability, if said conditional words have been judged as
9 comprising non-disfluency words and disfluency words in said step (b), by using a
10 dictionary containing a first language model which has been trained regarding
11 disfluency words and non-disfluency words, and a second language model which has
12 been trained regarding non-disfluency words and trained to ignore disfluency words so

13 as to recognize words showing the highest probability of representing said input words.

1 24. The method for speech recognition according to claim 23, further comprising the
2 step of:

3 calculating said probability based on said first language model, if said object
4 words have been judged as not being non-disfluency words in said step (a).

1 25. The method for speech recognition according to claim 23, further comprising the
3 step of:

4 calculating said probability based on said second language model, if said
5 conditional words have been judged as consisting only of non-disfluency words in said
step (b).

1 26. The method for speech recognition according to claim 24, further comprising the
3 step of:

4 calculating said probability based on said second language model, if said
5 conditional words have been judged as consisting only of non-disfluency words in said
step (c).

1 27. The method for speech recognition according to claim 23, said step (c) further
2 comprising the steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and
5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

1 28. The method for speech recognition according to claim 24, said step (c) further
2 comprising the steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and
5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

1 29. The method for speech recognition according to claim 25, said step (c) further
2 comprising the steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and
5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

- 1 30. The method for speech recognition according to claim 26, said step (c) further
2 comprising the steps of:
3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and
5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).
- 1 31. The method for speech recognition according to claim 27, further comprising the
2 step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).
- 1 32. The method for speech recognition according to claim 28, further comprising the
2 step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).
- 1 33. The method for speech recognition according to claim 29, further comprising the
2 step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 34. The method for speech recognition according to claim 30, further comprising the
2 step of:

3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 35. A storage medium readable by a computer containing a computer program to
2 recognize speech from texts comprising disfluency words and non-disfluency words,
3 said computer program being designed to make the computer perform the following
4 steps:

5 (a) judging whether words inputted as an object of recognition are non-disfluency
6 words;

7 (b) judging further whether said words constituting a condition necessary for
8 recognizing said inputted words consist only of non-disfluency words, if the inputted
9 words have been judged to be non-disfluency words in said step (a); and

10 (c) calculating a probability, if said conditional words have been judged as
11 comprising non-disfluency words and disfluency words in said step (b), by using a
12 dictionary containing a first language model which has been trained regarding
13 disfluency words and non-disfluency words and a second language model which has
14 been trained regarding non-disfluency words and trained to ignore disfluency words so
15 as to recognize words showing the highest probability of representing said inputted
16 words.

1 36. The storage medium according to claim 35, wherein said computer program is
2 designed to make the computer execute the additional step of:

3 calculating said probability based on said first language model, if said object
4 words have been judged as not being non-disfluency words in said step (a).

1 37. The storage medium according to claim 35, wherein said computer program is
2 designed to make the computer execute the additional step of:

3 calculating said probability based on said second language model, if said
4 conditional words have been judged as consisting only of non-disfluency words in said
5 step (b).

1 38. The storage medium according to claim 36, wherein said computer program is
2 designed to make the computer execute the additional step of:

3 calculating said probability based on said second language model, if said
4 conditional words have been judged as consisting only of non-disfluency words in said
5 step (b).

1 39. The storage medium according to claim 35, wherein said computer program is
2 designed to make the computer execute the additional steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and
5 calculating said probability based on said first and said second language models,

6 if said preceding word has been judged to be a disfluency word in said step (d).

1 40. The storage medium according to claim 36, wherein said computer program is
2 designed to make the computer execute the additional steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and

5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

1 41. The storage medium according to claim 37, wherein said computer program is
2 designed to make the computer execute the additional steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and

5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

1 42. The storage medium according to claim 38, wherein said computer program is
2 designed to make the computer execute the additional steps of:

3 (d) judging whether a word immediately preceding said object word is a
4 disfluency word; and

5 calculating said probability based on said first and said second language models,
6 if said preceding word has been judged to be a disfluency word in said step (d).

1 43. The storage medium according to claim 39, wherein said computer program is
2 designed to make the computer execute the additional step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 44. The storage medium according to claim 40, wherein said computer program is
2 designed to make the computer execute the additional step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 45. The storage medium according to claim 41, wherein said computer program is
2 designed to make the computer execute the additional step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 46. The storage medium according to claim 42, wherein said computer program is
2 designed to make the computer execute the additional step of:
3 calculating said probability based on said second language model, if said
4 preceding word has been judged as not being a disfluency word in said step (d).

1 47. An apparatus for speech recognition comprising:
2 an acoustic processing apparatus for converting analog speech input signals into
3 digital signals;
4 a first storage apparatus for storing an acoustic model which has learned voice
5 characteristics;
6 a second storage apparatus for storing a dictionary comprising a first language
7 model which has been trained regarding disfluency words and non-disfluency words,
8 and a second language model which has been trained regarding non-disfluency words
9 and trained to ignore disfluency words; and
10 an apparatus, connected with said acoustic processing apparatus and said first
11 and second storage apparatuses, for calculating a probability regarding said digital
12 signals using said acoustic models and said dictionary to recognize words showing the
13 highest probability of representing said input signals.

1 48. A computer system, comprising:
2 an input apparatus for inputting analog speech;
3 a converting apparatus connected with said input apparatus for converting said
4 analog speech into digital signals;
5 a first storage apparatus for storing an acoustic model which has learned voice
6 characteristics;
7 a second storage apparatus for storing a dictionary comprising a first language
8 model which has been trained regarding disfluency words and non-disfluency words,

9 and a second language model which has been trained regarding non-disfluency words
10 and trained to ignore disfluency words;

11 an apparatus, connected with said converting apparatus and said first and
12 second storage apparatuses, for calculating a probability regarding said digital signals
13 using said acoustic model and said dictionary to recognize words showing the highest
14 probability of representing said analog speech; and

15 a display apparatus for displaying the results of said recognition.